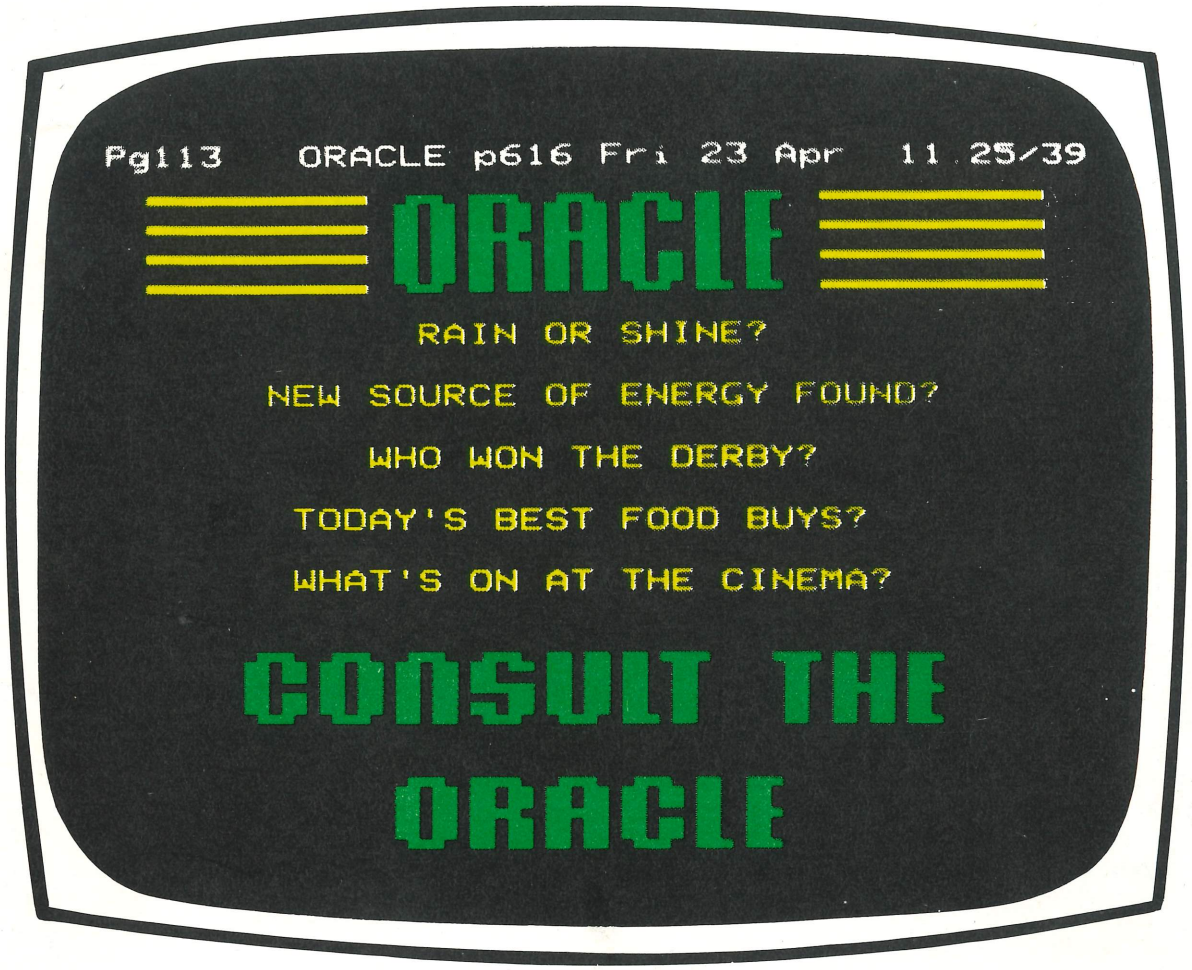
THIS IS ORACLE


Pg113 ORACLE p616 Fri 23 Apr 11.25/39
ORACLE
RAIN OR SHINE?
NEW SOURCE OF ENERGY FOUND?
WHO WON THE DERBY?
TODAY'S BEST FOOD BUYS?
WHAT'S ON AT THE CINEMA?
CONSULT THE ORACLE

information at your fingertips...

Television and radio provide up-to-the-minute news and information; but, for many purposes, the written word is more useful. Written material has the advantage that it can be read at any pace, the reader can stop to think, perhaps re-read the text a number of times.

ORACLE retains the power of presenting the most immediate news and information possible, yet combines it with the advantages of written material. Information is transmitted alongside the television picture, and an ORACLE receiver extracts and displays it in the form of characters and symbols on the television screen.

An extra set of controls allows the selection of any one of up to 800 different 'pages'. At any time the viewer can choose to watch either the normal television programmes or the ORACLE pages.

The pages can contain anything that appeals to the viewing public, and at the moment they offer an extensive range of the news and information that we need or are interested in, every day.

Choosing a page is even easier than dialling a telephone number, and the cost of an ORACLE receiver is likely to be within reach of very many viewers.

IBA INDEPENDENT BROADCASTING AUTHORITY

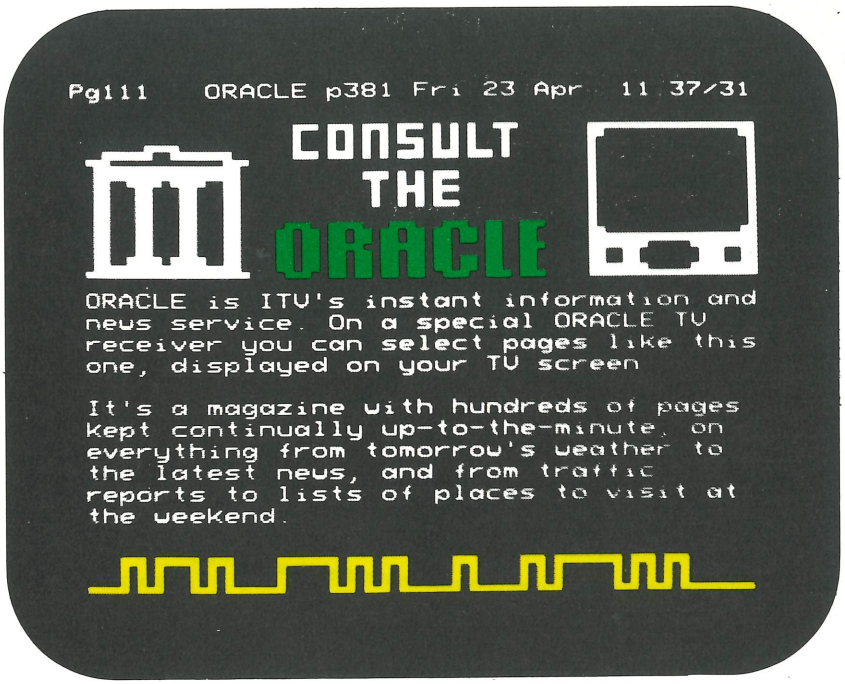
ENGINEERING INFORMATION SERVICE

the ORACLE service

ORACLE uses the broadcast television signal to carry extra information. These extra signals do not interfere with the transmission and reception of normal programmes. An ORACLE receiver – a television receiver with additional circuits – is capable of reconstructing written information and displaying it on the screen. The system allows the transmission of very many bulletins of information, and the viewer can choose any one by selecting a three-figure number on a set of controls – usually push buttons or thumbwheel switches. After a short interval the information appears and remains for as long as it is needed.

A major use of ORACLE is as an information service, but it can also supplement normal television programmes with sub-titles or linked pages.

The entire signal is accommodated within the existing 625-line television allocation, and so costs nothing in terms of radio frequency spectrum space. It is, effectively, the first broadcasting system to transmit information in digital form.


Pg111 ORACLE p381 Fri 23 Apr 11 37/31
CONSULT THE ORACLE
ORACLE is ITV's instant information and news service. On a special ORACLE TV receiver you can select pages like this one, displayed on your TV screen
It's a magazine with hundreds of pages kept continually up-to-the-minute, on everything from tomorrow's weather to the latest news, and from traffic reports to lists of places to visit at the weekend.

A page from ITV's ORACLE service

how did ORACLE come about?

ORACLE was initially the product of a team of IBA engineers. The name is an acronym for Optional Reception of Announcements by Coded Line Electronics. A service with information generated by computer was demonstrated first by the IBA early in 1973. Later, the organisations with an interest in such systems came together, with the object of devising a unified standard. A specification (ref. 1) for the current system was first published in 1974. The generic title 'Teletext' is now often used, but the name ORACLE remains for ITV's service.

The first ORACLE system allowed up to 50 pages, with text in only one colour. Although the technical basis is similar, the current system is more attractive and flexible – with many more pages, colours, and other features. This new system is the result of co-operation and the pooling of ideas by UK Broadcasters and Receiver Manufacturers.

In Autumn 1974 the Home Office authorised a trial period for experimental Teletext services, using the new UK standard. In mid-1975 the ITV programme companies began an experimental service.

what do ORACLE pages look like?

ORACLE pages look rather like pages of typescript, except that they can also include large-size letters and simple drawings. The photographs in this leaflet show a few examples.

The standard size words (like those in the central paragraph on the 'Consult the ORACLE' page) can use upper or lower case, and be in any one of six colours – red, green, blue, yellow, cyan, and magenta – or white. The shape of the characters is usually based on a 7 x 5 dot matrix, with a refinement known as character rounding.

The large-size characters and drawings are made by assembling small illuminated rectangles, each one-sixth of the size of the space occupied by a standard character, and these too can be in any of the six colours or in white.

As many as 24 rows of the standard size characters can be fitted on a page, and each row can have up to 40 characters. Each page can carry about 150–200 words (about 3 paragraphs on this page).

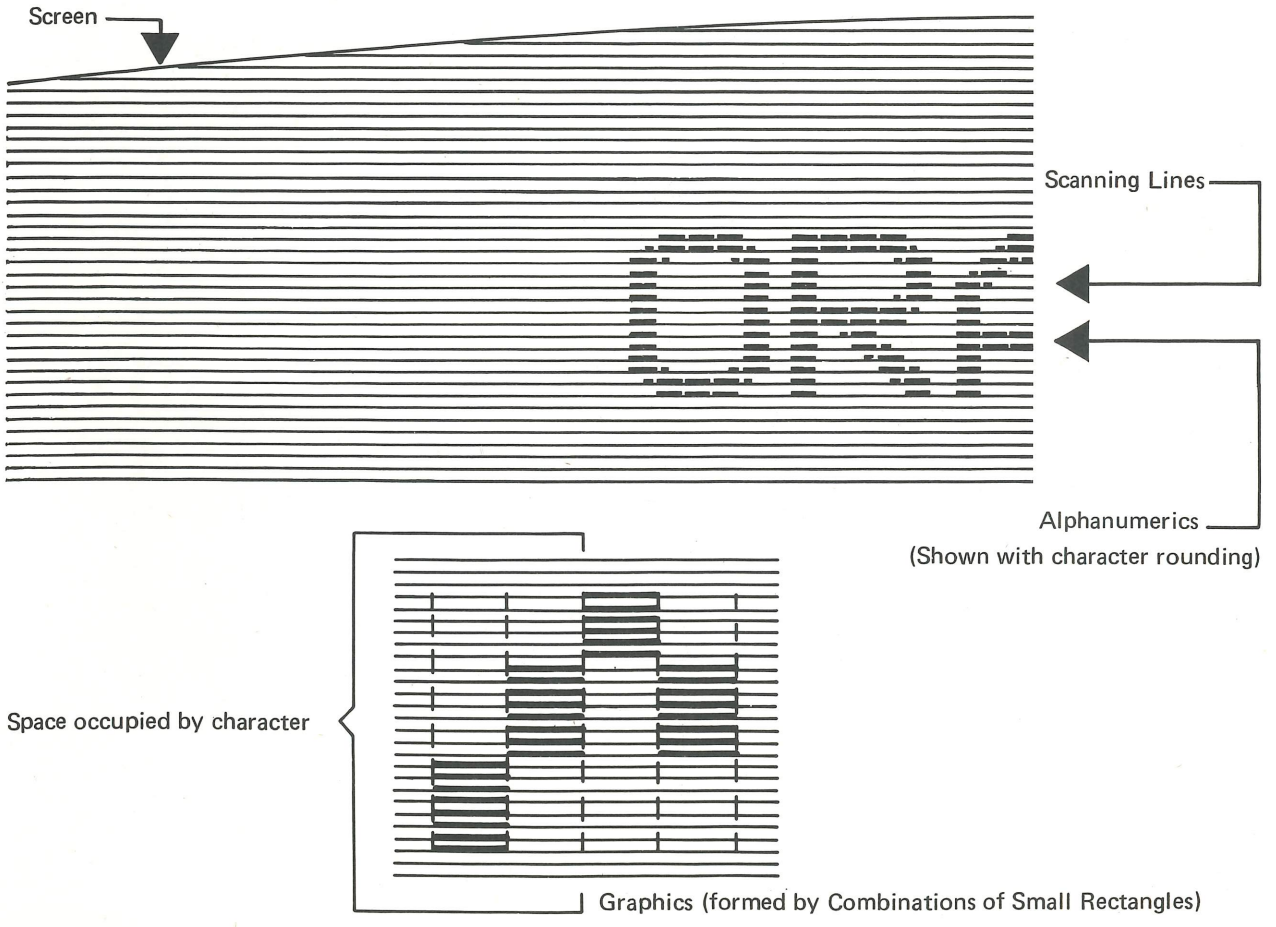
The row at the top of the screen always has the same format. It contains the title ORACLE, the page number or a cycling page number (or both), the day and the date, and the time, exact to the nearest second.

The remaining 23 rows can be made up of rows or part rows of text or the 'graphic' forming rectangles.

Part or all of each page can be made to flash on-and-off (usually once per second), to emphasise any particular item.

The page background is usually black, although, at the ORACLE editor's discretion, text can be enclosed in a black window and cut into the normal picture. Further, certain receiver designs allow the whole page (in white only) to be superimposed over the picture.

It's potentially possible for the system to carry up to 800 full pages; but, because of the way the pages are transmitted, this could mean an appreciable waiting time between page selections. So for the moment not all 800 pages are used at any one time.



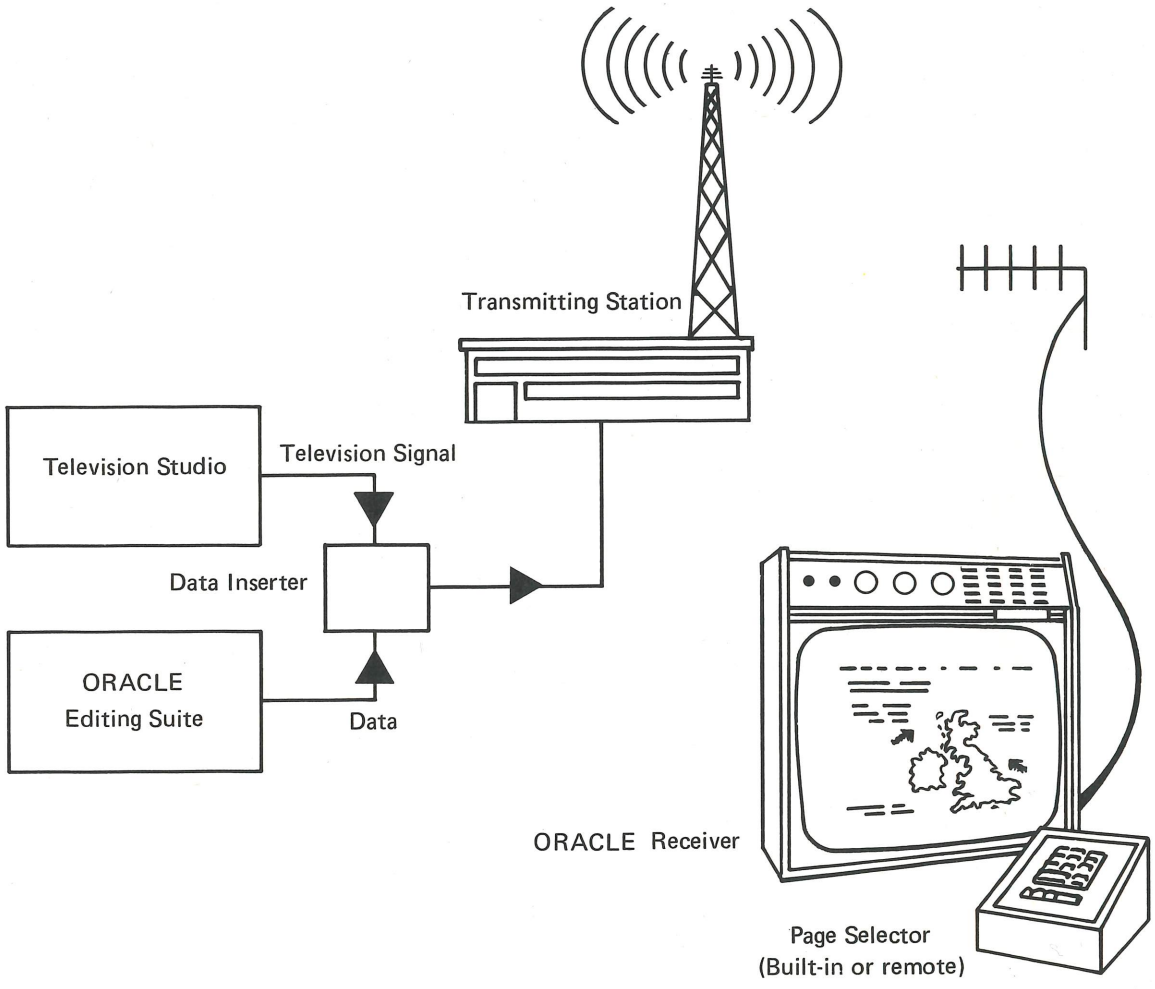
The ORACLE Display – a schematic showing how the alphanumerics and graphics are formed.

making more ORACLE pages available

The number of different pages available can be extended, without increasing waiting time, in two ways:

1 By MULTI-PAGES or self-changing pages. Here the content of the page is altered deliberately after sufficient time for it to have been read. The new pages, which appear automatically, would probably follow on from the previous ones. They could be, for example, lists of sports results.

2 By TIME-CODED PAGES or transmission-time addressed pages. All pages can be addressed (or labelled) not only by their number but also by the time at which they are transmitted. Usually the transmission time (or time-code) label is not used by the ORACLE receiver, but it can be set to select both page number and time. If it is, then different pages can be transmitted on the same page number at different times of the day. This still allows the viewer to choose which page he sees, provided he knows and pre-sets its transmission time.



The ORACLE data is added to the normal television signal, and the combined signal is transmitted. Pages are chosen on an ORACLE receiver merely by selecting a three-figure number.

how is ORACLE transmitted?

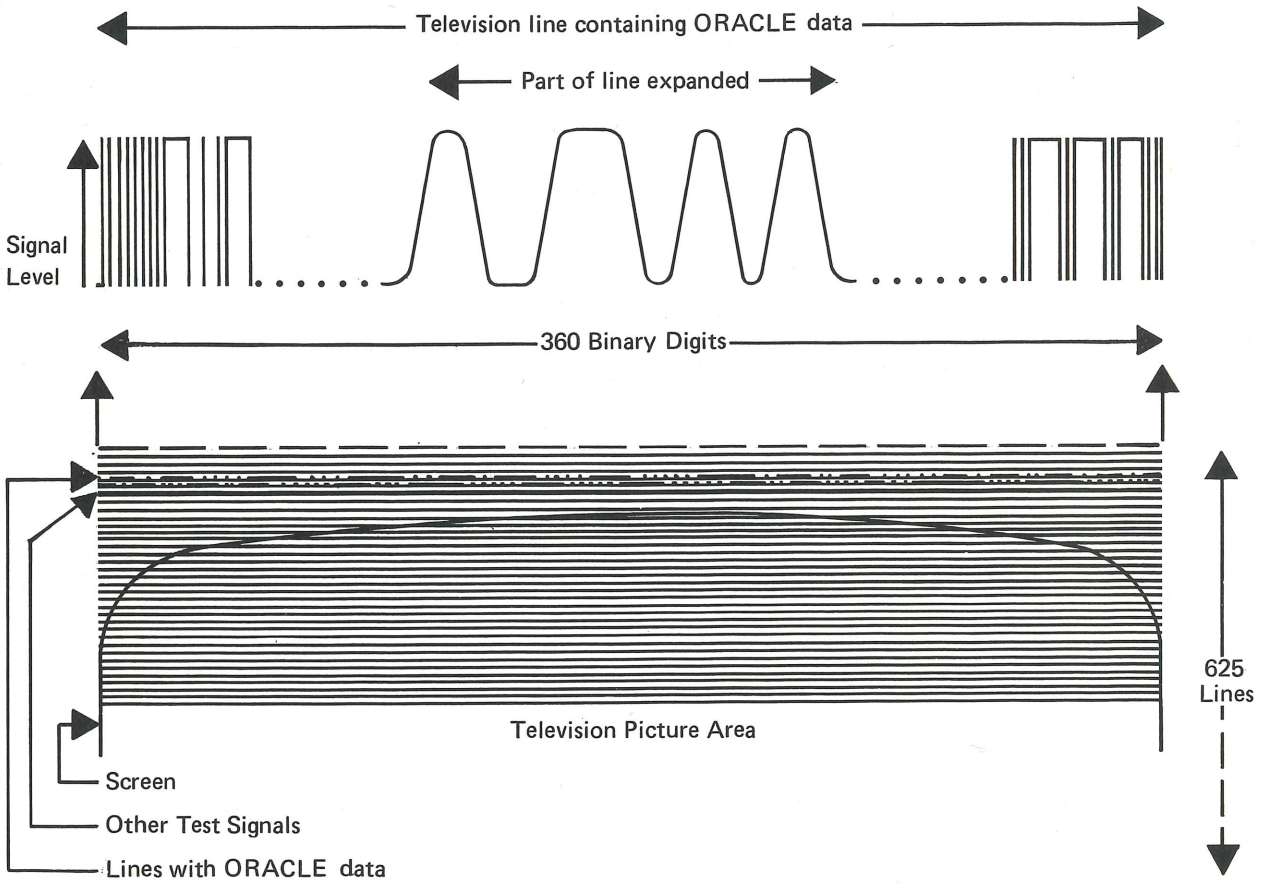
Television picture transmissions are made up of a large number of horizontal lines, but not all the lines are used to form the picture. About 40 or so lines are arranged to be off the top of the screen – like a horizontal border at the top of a photograph. Into this border we put our ORACLE information.

A television picture is made up by interlacing two sets of 312½ lines, 25 times a second. Into the 17th and 18th lines of each of these two sets (in the second set they are called 330 and 331) the ORACLE information is inserted in the form of binary pulses. If the height control on a receiver is incorrectly adjusted it is possible to see these as lines of bright dots above the picture.

Each line of pulses contains the coded data for one row of standard size text or graphics rectangles. The rows for a given page are transmitted one after another until the page is complete, then the next page and so on, until all the pages have been transmitted. Then the cycle begins again. It's like a conveyer belt system, with coded rows of text continuously loaded on, one after another.

If every line of a page has text or graphics on it, the page takes 0.24 seconds to transmit. The total time to transmit the complete cycle of pages depends on how many pages there are, and how full they are. This cycle time represents the maximum waiting time for the appearance of a page after selection.

The binary pulses on the data lines are grouped into two sections. The first section establishes which row of text it is on the page, and the second defines what is to make up the row. Each letter, number, or graphic symbol is represented by an eight-digit binary number. For the first row of the page the first section also establishes which page is coming up, and its 'time-code'.

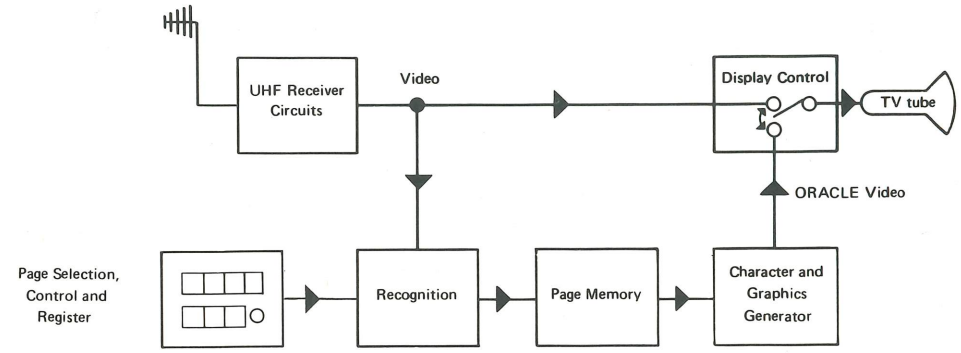


The position of the ORACLE data signals

what is needed to receive ORACLE

Additional circuits are needed in a television receiver to decode ORACLE. First, data extraction and recognition circuits examine the incoming 'conveyer belt' of ORACLE data lines, and extract those signals which make up the page which has been selected. The data from these lines is then stored (usually in an integrated circuit called a 'Random Access Memory') so that the page can be displayed at the same rate as a normal picture. The binary number codes are then translated to their corresponding characters or graphics patterns (in a 'Read Only Memory'). Finally a video raster scan representation of the page is switched onto the screen.

The reception of ORACLE like normal television, is susceptible to various kinds of interference. IBA trials, however, indicate that the great majority of those who receive television pictures well, will also be able to receive ORACLE.



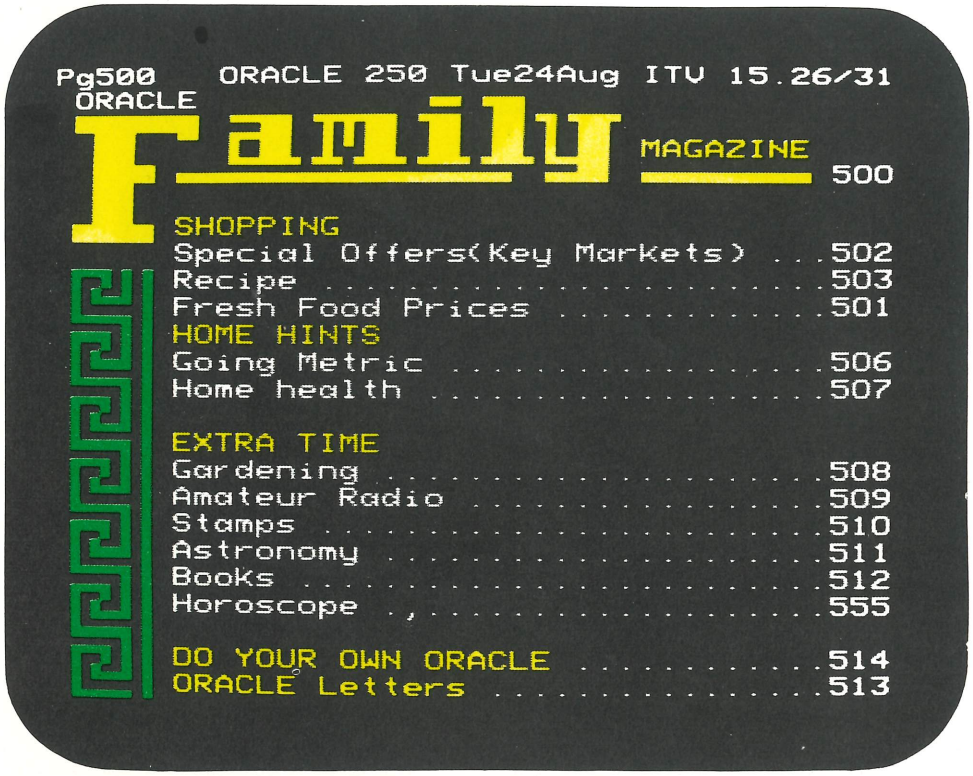
The ORACLE receiver system

The ORACLE editorial suite at London Weekend Television – written information on a visual display unit is converted to ORACLE data signals by a small computer.

how is ORACLE generated?

Independent Television staff at special ORACLE editorial suites use small computers to convert their copy to the sequences of pulses needed for transmission. These are then added to the normal television signal and the combined signal is transmitted.

The staff gather news and facts from a wide range of sources. Direct links to news agencies, etc, provide an up-to-the-minute service which can be conveyed to ORACLE within seconds.

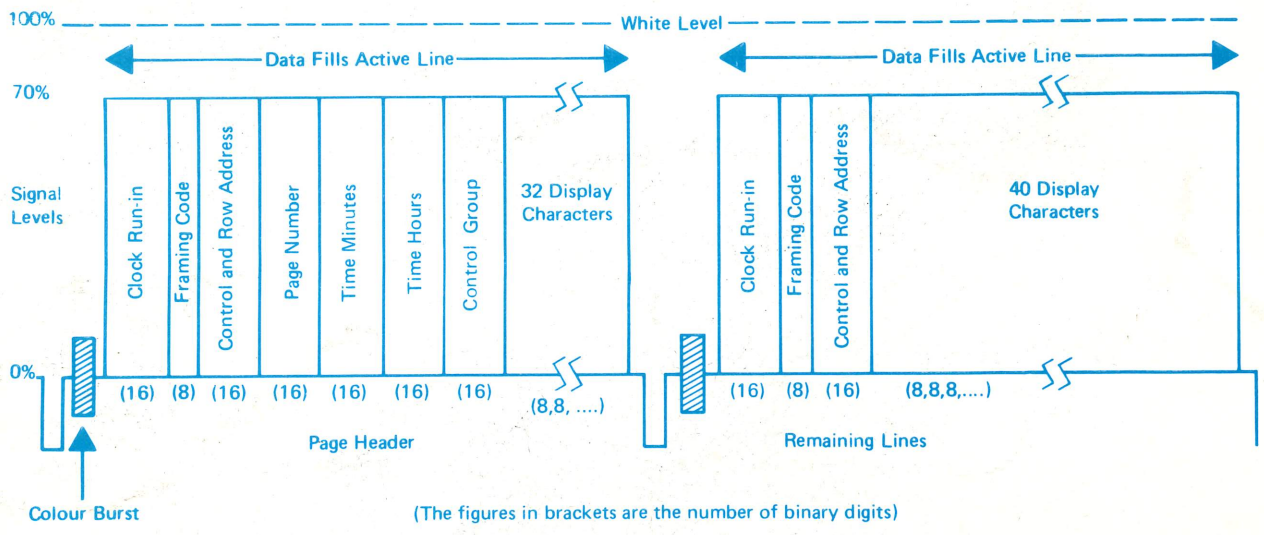


A sample page from ITV's ORACLE magazine

ORACLE the future

At the moment ORACLE provides a news and information service, and Independent Television is considering ways of extending the service. The ORACLE text can be superimposed on the normal picture, so sub-titles or notes can be used to supplement programmes. Particular interest is being shown in educational uses of this. Interest in the current ORACLE trials, and the continuing work on ideas for extending the service point to an exciting future for ITV's ORACLE.

ORACLE
brief specification



ORACLE data organisation

Data

Location – lines 17, 18, 330, 331 (may be extended to other lines later).
Rate – 6.9375 MHz (444 x line frequency).
Shape – approximate raised-cosine.
non-return-to-zero.
binary 1 corresponds to approximately 70% of the black-to-peak-white excursion.
binary 0 corresponds to black level.

Organisation of Data

The organisation of the data on the line corresponding to the top row of a page (the page header) is different from the remaining rows.

Page header

Clock run-in	8, binary 1–0 sequences to synchronise the receiver's data clock.
Framing code	A particular 8-bit word (11100100) for data line recognition and word group synchronisation.
Control and row address	16 bits containing the hundreds digit of the page number, the row number (both with Hamming code (ref 2) error protection bits), a header suppression bit, and other control bits.
Page number	16 bits containing the last two digits of the page number (with Hamming protection bits).
Time-code	32 bits for nominal transmission time in hours and minutes (with Hamming protection bits).
Control group	16 bits (including Hamming protection bits for various control functions, such as header suppression).
Display group	32, 8-bit words to define display (each with odd-parity bit).

Remaining rows

Clock run-in	as page header.
Framing code	as page header.
Control and row address	as page header.
Display group	40, 8-bit words to define display (each with odd-parity bit). They may be alphanumeric codes (to ISO 7), or graphic combination codes, or instruction codes (when what follows in the line is to be in a particular colour, or flashing, or 'boxed').

References

1 Specification of standards for information transmission by digitally coded signals in the field-blanking interval of 625-line television system.
Independent Broadcasting Authority, British Broadcasting Corporation, British Radio Equipment Manufacturers Association, October 1974.
(*A revised specification, incorporating changes made as a result of the experimental service, is due to be published in Autumn* 1976).

2 Error detecting and error correcting codes.
R. W. Hamming
Bell System Technical Journal, Vol. 29, No. 2, pp. 147–160, 1950.

For further information about ORACLE, contact:
Engineering Information Service,
Independent Broadcasting Authority,
Crawley Court, Winchester, Hants SO21 2QA.
Tel: Winchester (*0962*) 822444
or if you prefer:
Tel: 01-*584* 7011, and ask for Engineering Information.